

Caloptilia rufipenella Hübner (Lep. Gracillariidae),
a Species new to Britain.

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My story starts on the 12th of July 1970, when I was at Chippenham Fen, Cambridgeshire, working the alders (*Ent. Rec.* 82: 253). By chance a sycamore leaf with one of its lobes spun into a cone caught my eye. Clearly the work of a *Caloptilia*, it looked like the feeding of one of our rarest moths, *C. hemidactylella* Fab. The cone and others nearby were all vacated and there was no trace of cocoons spun in adjacent leaves. On subsequent visits to the fen I pointed out the old cones to Mr J. M. Chalmers-Hunt on the 31st of July and to Mr R. W. J. Uffen on the 11th of October; both these entomologists agreed that they were likely to have been made by *hemidactylella*.

Remembering how I used to find *Caloptilia betulicola* Hering flying freely at dusk in a Lincolnshire birch wood in late September, I wondered whether the sycamore-feeding *Caloptilia* would behave in the same way. Accordingly I paid an evening visit to Chippenham on the 22nd of September. Only one *Caloptilia* fell to my net. This was not *hemidactylella*, but appeared to be a dwarf specimen of *elongella* L., a species which occurs, though rather sparingly, in the fen.

It is a long time to have to wait a whole year before seeking a solution to an entomological enigma, and as most *Caloptilia* overwinter as imagines, I decided to have a shot at locating my quarry in its winter quarters. So the 10th of February, 1971 saw me back at Chippenham, beating the lower branches of some yew trees which grow in the wooded part of the fen. I had a lot of healthy exercise, but the reward for my labours, at any rate in terms of numbers, was meagre: only four moths fell into my tray. Two of these were *Zelleria hepariella* Stt. and the other two apparently *elongella*. There is a marked similarity in the colour of these two well separated species: except that one cocks its head and the other its tail in the air when at rest, they might be mistaken for each other. Presumably the liver colour of the forewings gives them excellent concealment in the situations they select for hibernation.

But to return to my two "*elongella*." There was a striking disparity of size between the two specimens. One was of normal dimensions, but the other was a dwarf resembling the moth I had netted in September. My suspicions were aroused.

There matters had to rest until the summer. My next visit to the fen was on the 4th of June, when I was accompanied by Mr E. C. Pelham-Clinton. No cones were to be seen on the sycamores, but this was not unexpected so early in the season. I was there again, this time with Mr Uffen, on the 4th of July, when the sycamore-feeding *Caloptilia* was one of our principal objectives. We started to find cones at once, but at first it seemed we were too late as the spinings were already vacated.

However, in due course we took three which still contained larvae.

I exhibited these larvae, two of which had already spun up, at a meeting of the British Entomological and Natural History Society on the 8th of July, describing them as possible examples of *hemidactylella*, but adding the opinion that they could well turn out to be a new species, for which *caloptilia rufipennella* Hübn. was the most likely candidate.

On the next day I returned to Chippenham Fen and worked the sycamores thoroughly. The cones were not scarce, but most of them were empty; however, I came home with eleven more larvae to add to the three I had found on the 4th.

In all, ten imagines emerged between the 16th of July and the 5th of August, the average date of eclosion being the 28th of July. These moths all resembled the two small *Caloptilia* taken the previous September and February. Inspection of the continental material at the British Museum (Natural History) confirmed my suspicion that the Chippenham species was *Caloptilia rufipennella* Hübn.

It may be helpful to others who seek to breed *rufipennella* if I give the reasons for the four casualties. Two perished as larvae. One was in the leaf I gave to Mr Jacobs as model for the drawing he has so kindly made to accompany this paper. In order to keep the leaf fresh for him, I put in water. This was a mistake, for the leaf withered far more quickly than those placed in a plastic box, and this mismanagement proved fatal to the larvae. The second larvae "committed suicide." When I found it, it was still in its mine (see below for this phase). On quitting the mine, instead of making a cone, it insisted on feeding externally on the original leaf. Thus it lived for about a week, in spite of daily offerings of fresh leaves placed under its nose. This increasingly withered diet in the end proved fatal. No doubt I should have forcibly transferred it and confiscated the old leaf. Another of my larvae failed to make its final cone and fed exposed, stripping off about a square inch of the lower surface of a leaf; but this individual survived and eventually became an imago.

The other two casualties occurred in the pupal stage. Three larvae spun up in the lid of their plastic home, and it was two of these which perished. In each case the moth developed fully in the pupal case, but then failed to emerge. The remainder, including all those which made their cocoons on leaves, came out successfully. The casualty rate is notoriously high in the pupal stage of this family, and to prevent desiccation, I placed a pinch of damp sphagnum moss in the box containing the pupae. Perhaps the leaves absorbed sufficient moisture but the plastic surface could not do so. There were no parasites.

The following is an account of the biology of *rufipennella*:—*Ovum*: I failed to find the egg, even with the help of a microscope. Possibly the shell is completely consumed, or the larva may travel some distance before starting to mine.

Larva: This is of a green colour, matching the lower surface of a sycamore leaf. Hering (1957) describes the head as yellowish, but to me it looks green and only slightly paler than the body. When the larva is feeding, the dorsal vessel shows distinctly darker, but when it is purged before pupation the caterpillar is unicolorous.

Method of feeding: At first the larva makes a tiny mine at the angle of two veins. The frass is packed to the sides leaving the centre tolerably transparent. On leaving the mine, the larva makes three cones successively. The first is a minute affair, consisting of the folding over of the extreme tip of a lobe. The second and third are more elaborate and are much of the same size. While making the cone, the larva leaves a small open "doorway" through which it emerges to do a deal of external spinning. The lobe is curled downwards so that the larva within can feed on the lower surface of the leaf. The first cone is commonly on the same leaf as the mine, but thereafter the larva almost always changes leaves before constructing a fresh cone. The leaf which I supplied to Mr Jacobs, which contains the mine and all three cones, is exceptional. The cones are generally five to ten feet from the ground, the higher ones being easier to see as they show up as dark blobs against the light. Most of those found were on saplings, perhaps only because the branches of the larger trees were out of reach. The larva feeds in June, sometimes continuing till early July.

Cocoon: I searched hard but failed to find the cocoon in the wild. In captivity the upper or lower surface of a leaf is generally selected; in two instances the chosen site was the angle made by the wall of the cone. The cocoon is small and compact, consisting of a shining yellowish membrane of silk.

Pupa: At first the pupa is green like the larva, but it darkens as the imago develops. For emergence, the pupal skin is extruded from the cocoon, and is transparent and colourless after its occupant has left. The pupal stage lasts from ten to fifteen days.

Imago: Span 11-12 mm. Antennae light golden brown, obscurely ringed darker. Head, palpa and thorax concolorous with the forewings. Abdomen, dark grey above, white beneath. Legs white, spotted above with dark brown; the tibiae of the forelegs and middle legs are clothed in dark chocolate brown scales, with a few whitish scales forming a narrow, ill-defined central pale band, more easily seen in fresh specimens. Forewings glossy mahogany or chestnut brown, with violet reflections when seen at an angle; terminal cilia concolorous with the wings, dorsal cilia dark grey. Hindwings and their cilia dark grey. Benander (1944) figures the male genitalia. The imago emerges during the second half of July or in early August and lives until the spring.

Variation:—In one specimen the colour of the forewings is golden brown. In two or three individuals there are suffused dark spots tending to form longitudinal lines. None shows



any trace of the triangular costal blotch found in most other members of the genus.

Distribution: According to Hering, *rufipennella* is a common species on the continent, feeding on imported species of maple as well as sycamore. In England, I have observed the larval cones at Chippenham Fen, Cambridgeshire, and at Barton Mills, Suffolk, about six miles from Chippenham. It would not surprise me if it turned out to be fairly widespread in East Anglia. The apparent absence of parasites suggests that it is newly established, and it may be extending its range. The larval cones remain in evidence until the leaves fall and as they are quite conspicuous, they will facilitate the quest for new localities; entomologists should, however, be careful not to confuse a rolled leaf with a cone. Dwarf specimens in collections which were taken as imagines and determined as *elongella* or *betulicola* should be checked in case they are *rufipennella*.

The three species are very similar, but the following points of difference may be noted:—

(1) Size. *Rufipennella* is much smaller, with a wing-span averaging 11-12 mm as against 16-17 mm in *betulicola* and *elongella*. Brown (1946) gives the dimensions of *betulicola* as 7-9 mm; this is evidently a misprint.

(2) Colour. *Rufipennella* is generally chestnut brown, and the other two more yellow brown, but the species are variable, and some of the colour forms overlap.

(3) Forelegs. In *elongella* and *betulicola* the tibiae are usually concolorous with the forewings and lack the obscure pale band. In *rufipennella* the tibiae are distinctly darker than the forewings and possess the band.

(4) Abdomen: The underside of the abdomen is silvery white in *rufipennella* while in the other species it is yellowish white.

In conclusion I wish to thank Mr S. N. A. Jacobs for his drawing to show the larval feeding, and Mr D. S. Carter of the British Museum (Natural History) for his advice over the wording of the description of the imago and its variation. Specimens will be placed in the British Museum after the autumn exhibitions.

REFERENCES

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